

# THE FUTURES OF TRANSPORTATION

Report of the Transportation Visioning Summit

NOVEMBER 30, 2016

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# THE FUTURES OF TRANSPORTATION

## Report of the Transportation Visioning Summit

Convened by the International Bridge, Tunnel and Turnpike Association, November 30, 2016

On November 30, 2016, the International Bridge, Tunnel and Turnpike Association (IBTTA) convened a “Transportation Visioning Summit” with leaders of 18 transportation-related associations and societies. The purpose of the summit was to develop a vision for a federal transportation program that addresses current and future challenges. While the summit did not conclude with a single vision, the meeting was an important step in advancing a common vision among major transportation groups.

Weeks before the summit, IBTTA conducted a series of telephone interviews with summit participants to get a sense of the long-term issues and opportunities they saw for the sector. The product of these interviews helped shape the summit agenda. What follows is a summary that captures the highlights of the day’s discussions in the words of the participants.

IBTTA wishes to acknowledge and thank all the participants for their time and energy to participate in the summit and the pre-summit interviews.



*“I’ve had the chance to meet with many of you at this table individually. You are leaders in transportation and your organizations cast a long shadow. Our goal today is to discuss the future of transportation and how to move people and goods more safely and efficiently.”*

– BUDDY CROFT, 2016 IBTTA PRESIDENT



*“As one who has worked for many years on European transportation policies in Brussels, I would like to learn what you think about the future of transportation. Let’s explore how our businesses can find sustainable mobility solutions for our citizens.”*

– EMANUELA STOCCHI, 2016 IBTTA FIRST VICE PRESIDENT

# PARTICIPANTS

**BUDDY CROFT**

Executive Director, Rhode Island Turnpike and Bridge Authority  
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American Automobile Association

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National Asphalt Pavement Association

**PAT JONES**

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International Bridge, Tunnel & Turnpike Association

**ANDREW NEWHART**

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American Bus Association

**NEIL PEDERSEN**

Executive Director  
Transportation Research Board

**BARB ROHDE**

Executive Director  
Mileage-Based User Fee Alliance

**PETE RUANE**

President & CEO  
American Road & Transportation Builders Association

**STEVE SANDHERR**

CEO  
Associated General Contractors of America

**TOM SMITH**

Executive Director  
American Society of Civil Engineers

**CHRIS SPEAR**

President & CEO  
American Trucking Associations

**ANDREW STASIOWSKI**

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Truck Renting and Leasing Association

**EMANUELA STOCCHI**

Director of International Affairs, AISCAT (Associazione Italiana Società Concessionarie Autostrade e Trafori)  
First Vice President, International Bridge, Tunnel & Turnpike Association (2016)

**RON THANIEL**

Vice President of Legislative Affairs  
ITS America

**DICK WHITE**

Acting President & CEO  
American Public Transportation Association

**BUD WRIGHT**

Executive Director  
American Association of State Highway and Transportation Officials

# AUTONOMOUS & CONNECTED VEHICLES

Participants pointed to the tremendous potential of autonomous vehicles (AVs) to improve safety, boost economic efficiency, make freight handling more reliable and open a whole new realm of driving experiences—and the equally tremendous potential for unintended consequences. Part of the discussion turned on the ability within current regulatory structures to strike the right balance between encouraging innovation and assuring public safety.

**MR. JONES:** The first issue we're going to discuss is autonomous vehicles and related innovations in technology. During the pre-meeting interviews, one participant said autonomous features will make roads and trucking operations safer over the next five to 10 years. But the tougher challenge on the road to full autonomy will be to shift the mindset of people who still expect to get behind the wheel of their own vehicle. A related question, another participant said, is how quickly drivers will grow to trust the new technology. Another person said, "You're talking about a game-changer...if every vehicle could speak to one another, even if someone's driving drunk, the other vehicles can see what that car is about to do." Another person said, "Our current regulatory structure isn't going to be able to keep up with the pace of technological changes, so we need to think of ways to make government more nimble and flexible while also preserving safety. I think the autonomous vehicle guidelines and cybersecurity guidelines are a first step in trying to do that." That's our first discussion prompt. What do you think about these issues?

**MR. SMITH:** I think connected and autonomous vehicles are an exciting opportunity that will advance transportation efficiency and safety. We hear about safety fears associated with autonomous vehicles, including the Tesla driver killed in a crash in Florida last year. Surprisingly however, we don't hear a big outcry about the 100 people who are killed on our roads in the United States every day. To me, the status quo is unacceptable, and it is clear we need to invest in our surface transportation infrastructure, with autonomous vehicles being a logical part of the solution. It will address sustainability by utilizing technology to more efficiently move people and goods, and will ultimately improve safety.

**MR. THANIEL:** We know that 94 percent of road fatalities are related to driver error. The big question is what kind of regulatory structure will we have surrounding autonomous vehicles and at what level of government will that happen? The public needs to feel that this technology has been tested and is safe.



*"...what kind of regulatory structure will we have surrounding autonomous vehicles and at what level of government will that happen?"*

—RON THANIEL

**MR. PEDERSEN:** There is tremendous potential for autonomous vehicles but there's also tremendous opportunity for unintended consequences. We need to think about what are we trying to achieve, what are those overall goals as AV technology gets implemented. What do we want to avoid happening? Forecasts of VMT from AV and shared ride services range anywhere from a 50 percent decrease to a 200 percent increase. If this ends up encouraging far more sprawl with far more long trips, it has the potential of significantly increasing VMT.

**MR. WRIGHT:** What are the implications for public transportation outside of large urban cores? For instance, shared ride services could take the place of a large transit bus that is operating at less than full capacity. Another issue relates to what the modal mix will be 40 years from now.



*"AV is going to be one of the biggest changes we see in our lifetime. The technology will go there and I think it's a foregone outcome that we're going to see this."*

—DICK WHITE

**MR. WHITE:** I think AV is going to be one of the biggest changes we see in our lifetime. It will be measured in ways that people think about the Internet. The question is, how long is this going to take before something like this takes root? There are practical issues related to





*"We spend \$49.6 billion a year sitting in traffic. That computes to 246,500 drivers sitting idle for an entire year, every single year."*

—CHRIS SPEAR

safety, regulation, etc. The technology will go there and I think it's a foregone outcome that we're going to see this. We'll have driverless cars, driverless buses and driverless trucks. Three quarters of the cost of running a transit bus is the labor cost. It's going to have a huge effect on the adaptive re-use of space inside communities. You're not going to need all this space for roads. We can't even begin to imagine the impacts it will have.

**MR. GROSSMAN:** As a community, we get tied up around the axle about planning for the transition and not planning for the end state. The move to automated vehicles is not a choice, it's a foregone conclusion. If we could envision what that future state looks like, then we can work backwards and plan a transition to reach that end state instead of the reactionary mode that we're looking at right now.

**MR. JONES:** Several people have mentioned the truck driver shortage. Chris, tell us how you see autonomous vehicles in terms of the truck driver shortage and other ways to help the trucking industry.

**MR. SPEAR:** I quite agree with Dick. The movement to autonomous vehicles is a foregone conclusion. I don't lose any sleep over replacing drivers. We're really talking about long-haul trips. What are the efficiencies? Less fuel burn, lower emissions. These are all measurable returns. We spend \$49.6 billion a year sitting in traffic. That computes to 246,500 drivers sitting idle for an entire year, every single year. If you alleviate that, that's a mammoth return to our industry and the economy and to drivers, many of them paid by the mile. When horse-drawn carriages gave way to automobiles, we didn't say "we've got to regulate this right now." Innovation will outpace anyone's ability to regulate. You're not going to regulate this. You don't even know what it is. What we really need is federal, state, and local entities working hand in glove with all stakeholders. Not just the auto OEMs. All stakeholders. In the next 3-5 years, this will move away from autos and it will move over to the commercial sector. Because the whole business dynamic is different. I think a lot of consumers are not going to want to pay \$10,000 more for a car that will drive itself. But in the business world, if you tell me I'm going to save this much on my fuel burn, I'm going to get environmental credits, my drivers are happier, they're going to stay longer and get paid more, and they're more productive; that's good for everybody; it's good for the economy. There are supply chain benefits from that.

I'm not threatened by it. It's a foregone conclusion. We need to stop talking about how we're going to regulate it and start talking about how do we nurture this in a creative and constructive way. It impacts multiple agencies that aren't even contributing to the discussion. This doesn't even get off the ground if you don't have the FCC, which now is debating whether to allocate seven channels of spectrum to the cable industry or to safety. I would argue if you're going to do connected trucks, cars, and infrastructure, you've got to have the spectrum. And I don't like the idea of sharing spectrum and those seven channels with Starbucks. The Department of Homeland Security needs to be at the table and the Agriculture Department. None of these agencies are even part of this discussion because one agency, NHTSA, has gotten the green light to run all of it.

I think there's got to be inclusivity within the federal government and amongst the states. You've got to have all the players – commercial, consumers, passenger vehicles – all at the table to make that work. We have a chronic driver shortage. Any way that you can move freight more safely, more efficiently, and with less congestion, you're only helping my industry. We move 70 percent of the nation's freight. For us to get from 70 to 80 percent, we're going to need this technology or we're going to need more drivers. We'll figure this out.



*"We move 70 percent of the nation's freight. For us to get from 70 to 80 percent, we're going to need this technology or we're going to need more drivers."*

—CHRIS SPEAR

**MR. JONES:** Bud, you said in your interview that "Governments feel an obligation to be assured that nothing could ever possibly go wrong. But in so doing, we end up with more regulation than is necessary and either entirely stifle or slow down substantially the advance of technology. There's got to be some role for government. Opening the door and letting everyone come out to the table with new approaches is probably a bit short-sighted. But given the pace at which technology is advancing, having the government try to stay ahead of that and regulate it would completely spoil it."



*"Government's role is to determine what the playing field is and then let the private sector and the innovators play on that field."*

—BUD WRIGHT

**MR. WRIGHT:** I think Chris has said it well. I think we're inevitably going there. Government's role is to determine what the playing field is and then let the private sector and the innovators play on that field. I don't see any possibility that NHTSA or any other federal agency is going to be able to keep up. We have to address the transitional issues because we're going to be operating in a transitional mode for a long, long time.

**MR. GROSSMAN:** I think NHTSA recognizes that other agencies need to be involved. They recognize that the traditional way of doing regulation may not be the best way to do it on this topic. There is a wide spectrum of approaches in the states. From California who was first to publish regulations to other states that have said they are not going to regulate, believing that approach is best to support innovation. Balancing the state's responsibilities for protecting the public while supporting innovation, and at the same avoiding a patchwork approach from state to state, will be key.

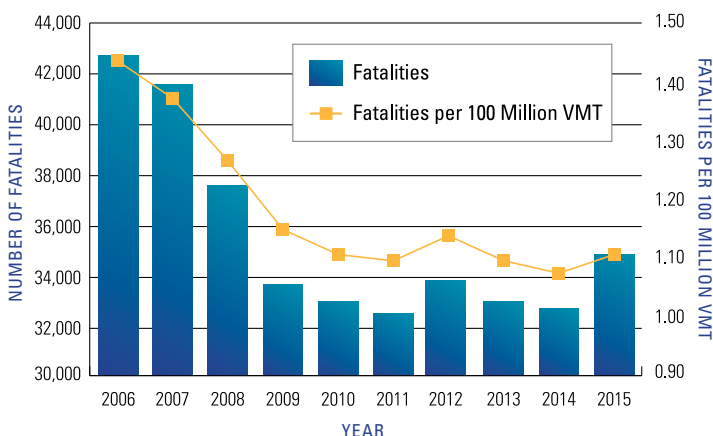
**MR. PEDERSEN:** It's difficult for us to imagine what will happen three years into the future, yet state departments of transportation and others are being asked to make decisions about investments that will last 30-40 years. I think this is one of the big dilemmas we're facing. The degree of efficiency that we will get just from closer headways alone will probably have a bigger impact on the future of the interstate system than any demographic changes that we're talking about. Because this technology is changing so fast, we'll need to adopt a dynamic planning process.

**DR. HENDREN:** I agree with the comments that we don't want regulation to stand in the way of innovation. But at the same time, as the owners of our country's infrastructure we need to know what to do today, how to deal with these new technologies today. I have two young girls. As parents, we don't tell them what to do every step of the way, but we set rules and boundaries so that — out on the field "of life" and within those boundaries — they are free to play the game. I think we have to do some things today, from a regulatory perspective and as the investors/owners of the infrastructure, to create a safe playing field where we can have a great game and see some fantastic results. But I think it's our job to be the parents, or the adults, here.

**MR. SPEAR:** My concern is this: NHTSA issued voluntary guidance. Now some states have turned that around and said, you've got to complete this checklist before we will license your equipment. In my view, that's backdoor rulemaking and we should call them out on that. In my opinion, you need multiple agencies engaged in coming up with the rules for autonomous vehicles. It can't be just one agency. I think Congress needs to have a big oversight role in this. And they're still trying to figure out what it's going to be. But unless that happens, I think we're going to end up with a patchwork of requirements that's going to make a massive headache for everybody including the trucking industry.

**MR. RUANE:** We're big advocates of new technology — and a lot of it plays a huge role in our business — but I don't want us to get caught up in the trap that technology is the panacea to solve all our problems. We've fallen into that trap before. Don't ignore the fact that we're going to have to change our infrastructure to accommodate autonomous vehicles. We're going to design things differently, we're going to build things differently. And my members see this as an opportunity. But we also have to focus on the basics. We need leadership from Congress and the administration, and right now I don't see it. We need some umpiring, but if they get all laissez-faire about it, it's going to be chaos.

## U.S. MOTOR VEHICLE FATALITIES



Sources: Federal Highway Administration, National Highway Traffic Safety Administration, American Society of Civil Engineers.



*"Don't ignore the fact that we're going to have to change our infrastructure to accommodate autonomous vehicles."*

—PETE RUANE

# SMART CITIES AND SMART DESIGN

For many years, urban planners have been talking about redesigning cities, with nodes of population density around transit systems, to make it possible and desirable for more people to live closer to where they work, learn and play. More recently, telecommuting has entered the lexicon and the planning toolbox, enabling knowledge workers to connect with offices and colleagues from home (or from their neighborhood coffee shop or a nearby park). None of these trends will eliminate the daily use of private automobiles, but they'll be one of the factors influencing transportation demand in the years and decades ahead.

**MR. JONES:** Pete, I'm reflecting on your statement that we're going to have to change the infrastructure for autonomous vehicles. And Tom, you had a quote that seems like a natural segue to a discussion of climate, energy, sustainability, smart cities and smart design, which is our next topic. You said in your interview, "We talk about more efficient ways to get from point A to point B, but the better question might be why we have to move them. You could talk about telecommuting and redesigning cities, with more intense nodes around transit, which is like going to the past when people lived, worked, and played in the same areas. You're always going to have some demand for private automobiles, but can you reduce the requirement on a daily basis?" Thinking about the way we're going to organize ourselves in 10, 20 30 years, how can these concepts influence what we're doing?

**MR. SMITH:** I think this is a critical issue because we talk a lot about how to move people efficiently from one point to another, which obviously needs to remain a top priority. We also, however, need to focus on effective and efficient land use planning. I drove into D.C. today from Tysons and I know many ASCE employees passed me in cars going in the opposite direction to our office in Reston, Virginia. We have become accustomed to traveling back and forth and you wonder why we set things up with the kind of sprawl that we have. Effective land use planning and transit systems enable us to start moving away from that. At Tysons, we have four new Metro stations most of which don't have any parking lots because we have a long-term plan that will combine residential and commercial development, so people will live, work, and play in one location. In that sense, we're becoming more efficient with our transportation infrastructure. The smart cities concept has many different elements to it, certainly including cutting edge technology, but also including effective zoning and land use planning.

**MR. GRELLA:** As much as people like convenience and the option to not go far, one lesson that we seem to be learning right now is that technology allows people to feel empowered and to call their own shots. I recently heard Governor Rendell make a point about high speed rail. Could you imagine what high speed rail could do for a housing market like Philadelphia? If you can get a house for less than half of what it costs to live in Manhattan, and you could take the train

from Philly to New York in 20 minutes, then you're going to live in Philadelphia! So as much as we may want to eliminate some of the back and forth, people will still want to move.

**DR. HENDREN:** Building on what Jonathan said, one advantage that technology brings is that we may finally break the auto centric, vehicle centric view of transportation. When you think of mobility, you think of a vehicle. You get in the vehicle and you're going to move yourself, right? The big shift we're going to see is that you're no longer connected to your vehicle, you're connected to mobility. And that will be good for us because that's what we're selling. We're not selling "get in your car." We're selling mobility. The question is, what does this infrastructure look like and how does it change because we are not vehicle centric anymore?

*"The big shift we're going to see is that you're no longer connected to your vehicle, you're connected to mobility. We're not selling "get in your car." We're selling mobility."*

– PATRICIA HENDREN







**MR. SMITH:** I think that's exactly right. What is your goal of moving people efficiently from one point to another? I could not take metro today due to other meetings, so I drove here as one person in a two-ton SUV. And I saw hundreds of people doing the same thing. It's totally inefficient to be using that level of energy and infrastructure for one person to travel 20 miles back and forth. We have to ask ourselves, what's our goal? If you were looking at the problem from 50,000 feet, you wouldn't do it the way we're doing it today.

**MR. JONES:** Before this meeting, I asked Neil Pedersen to help me with some research around the topics that we've been talking about. One report was an OECD study called *Shared Mobility: Innovation for Livable Cities*. ([www.itf-oecd.org/sites/default/files/docs/shared-mobility-liveable-cities.pdf](http://www.itf-oecd.org/sites/default/files/docs/shared-mobility-liveable-cities.pdf))

The study models the impact of replacing all personal automobiles in Lisbon, Portugal with shared taxis and mini-buses. Here are the findings: congestion disappeared, traffic emissions were reduced by a third and 95 percent less space was required for public parking in our model city served by shared taxis and taxi buses. The car fleet needed would be only three percent of the size of today's fleet. And although each car would be running almost ten times more kilometers than currently, total vehicle kilometers would be 37 percent less even during peak hours. The much longer distances traveled imply shorter life cycles for the shared vehicles. This enables faster uptake of newer, cleaner technologies and contributes to more rapid reduction of CO2 emissions from urban mobility.

Here's my question: Can we see this happening? If so, it's going to have huge implications on the physical infrastructure that we're building and the vehicles that we use. Is this even on our radar screen?

**MR. WHITE:** It's definitely on the radar screen. There's a commercial aspect and a consumer aspect. It's going to be akin to the shared ownership society that the millennials are demonstrating right now. This is their lifestyle. They don't own anything. They don't own a house, they don't own a car, they do Airbnb, there going to do shared vehicles. It's going to be a service. You're not going to own it, it's going to be a service. You're going to use it when you want it for a trip; you'll call a car that's running around all by itself autonomously, it's not in a parking garage somewhere, it's electric, the whole nine yards. This Lisbon thing is a glimpse of the picture we're going to see in the future. We keep talking about an end state, a transition aspect to it, and the current condition.



*"...don't let anybody take their eye off the ball on the current state because we are dying, we are in a deep, deep hole right now."*

– DICK WHITE

Pete warns us don't take your eye off the ball on the big problems we have today. We have huge problems today. Congress and elected officials like nothing better than to come up with an excuse why they don't have to do something. We don't want to give them the excuse that they don't have to do something because we have this picture in the future, it's 30 years out, and it's going to change things in remarkable ways; it's going to have all kinds of changes on how we use capacity, transportation, everything. And people are going to say, great, then we're not going to need to replace all this infrastructure. But we have three or four trillion dollars of funding needs for infrastructure; it's sitting out there. Even if you cut that in half, we're never going to take care of that. One of the things we have to be careful about is that it's great under the visioning thing, but I think we should be thinking about three pieces if this is ever going to go anywhere: a vision, a transition, and a current state and don't let anybody take their eye off the ball on the current state because we are dying, we are in a deep, deep hole right now. And some people would like nothing more than to figure out why they don't have to help us get out of it.

**MR. JONES:** Picking up on what Trish and Rob said, while we're envisioning this great future, we still need to know what to do today. Is there something we can anticipate about that future vision and the transition period that would actually help us overcome some of the challenges we face today?



**MR. SPEAR:** I think we have to be concerned about our dependence on these technologies. The GPS system is something we really now depend on, and if you lose that, then it will set us back. It won't break us, but we'd have to revert back to some old methods without it. That's just one example. When we are talking about technology and the enabling capabilities of it, we have to think in the context of national security. And infrastructure, in my view, is national security. We can't be so dependent on technology that we make ourselves vulnerable for those that would like to do us harm.

**DR. HENDREN:** We have this asset that the Ubers and Googles are using for free. Even if we move to this non-vehicle centric mobility, they are still going to drive on bridges and roads. How do we use their need for our stuff to get out of this funding hole we're in? I think we need to do a better job of selling the use of our "goods," the transportation system.

**MR. RUANE:** The public and the media do not understand that all the people we represent are users of state of the art technology every moment that they're breathing. Yet the image we have is that we are Neanderthals and we are not using technology. We have a great story to tell, but we're not telling it effectively.

*"... all the people we represent are users of state of the art technology every moment that they're breathing. Yet the image we have is that we are Neanderthals and we are not using technology. We have a great story to tell, but we're not telling it effectively."*

– PETE RUANE



Source: 2017 Infrastructure Report Card, American Society of Civil Engineers. (Estimated funding and needs for the period 2016-2025)







# THE FUTURE OF FREIGHT AND GOODS MOVEMENT

The decades ahead might well see the introduction of dedicated truck corridors along major highways to relieve congestion for passenger vehicles, eliminate costly bottlenecks for commercial traffic and improve safety for both. Technology will be a major enabler of these developments but not a panacea for all mobility challenges.

**MR. JONES:** Let's transition to the issue of freight. In the interviews, several people said that the near to medium future will see dedicated freight or truck corridors along some major highways to relieve passenger congestion, address freight bottlenecks and improve safety for both sets of users. What do you think about this?

**MR. SPEAR:** We are interested in ways to alleviate congestion through new construction. Truck only lanes have proven some benefit. But we are also running freight all over the national network and not just in those bottleneck cities in the Northeast corridor. Those models don't particularly align with some of our more rural settings. They don't have the throughput to pay for them and they don't have the congestion. Those projects are still in dire need, the roads still need to be serviced and administered and funded. I think it's going to be a question of how do you create a good package with good policy principles. I think we'll need multiple funding sources to make that happen. And I think we need to keep a very open mind and go big. And that's going to require a lot of a strong leadership, not just on the Hill but by the administration to make it happen. I think we are ready, we've got skin in the game. We are already nearly half the tab in the trust fund and willing to pay more.

*"We can't forget about freight because those metropolitan areas are going to demand just as much if not more service from goods movement as they do today."*

— BUD WRIGHT

**MR. WRIGHT:** One of the things that's underappreciated and under analyzed is urban goods movement. Especially if we are going to see population growth that many predict will happen in metropolitan areas, that means even more goods will be moving into these areas. And that means delivering them in a downtown setting. Often when you look at the models of what a future city looks like, you never see a truck, you never see a vehicle delivering goods. I'm not downplaying the significance of the other modes, but you see very narrow lanes and a bicycle or pedestrian accommodation. But truck accommodation

and freight movement accommodation seem to be a forgotten part of that puzzle. We can't forget about freight because those metropolitan areas are going to demand just as much if not more service from goods movement as they do today.

**MR. PEDERSEN:** One of the big issues to think about when you're looking 30 years or 50 years in future, is the future of globalization and trade. There are huge implications in terms of intermodal transfers, whether it's at port facilities or transfers between rail and truck. As we think about our vision for the future related to freight, it has to go in the context of greater globalization and greater intermodal transportation.

**MR. SPEAR:** We're seeing a big transformation and evolution in our economy right now. There's no secret that trucks and rail have battled in the past. But we're one of their biggest customers now, and that's just happened in the last ten years. We are thinking about how to integrate and make trade work seamlessly. Old walls we've built up around our industries are starting to fall and we're starting to work collectively. I look at ways that we can work collectively in funding infrastructure. Good policy hinges on the ability to raise the revenue, administer the revenue, and help those rural communities. We need to move all over the country and the federal government has a profound constitutional role to play there. We've got conservative groups out there saying that a ten-year trillion-dollar infrastructure bill is not going to create jobs. Well that is just a bunch of garbage. We're not talking about "stimulus." We're talking about ongoing repair and maintenance to our vital infrastructure. This is not a three-month project; this is a constant thing to make our economy work and grow. It's laughable to me that anyone would take those arguments seriously, but apparently, it's resonating. That's a serious policy headwind. A bunch of us in this room will have to knock that down because it's not true. Look at our economy; this is the 60-year anniversary of our national interstate highway network. We built that and look what it's become, look what it's done to the country and the economy. It's a beautiful thing and I'd love to see what it's going to look like 60 years from now. I'm a states rights guy on a lot of issues. But on this one I stand very firm, there is a role for the federal government to play and it needs to remain that way. We all have to be very vocal to say that this is the policy that needs to be maintained going forward and here's why.



**MS. INGRASSIA:** I'm thinking about consumers and the average person. We've been challenged over many decades to find ways to motivate the general public to support an increase in funding. In survey after survey there is acknowledgment by a majority of the public that we need to invest more. But nobody is willing to pony up additional resources for it. I think it's still going to be a challenge to make the case that we need to invest more. I don't think a trillion-dollar financing plan is something that most people will really understand. And how does that get translated into pothole repair or bridge replacement? We would still be advocating a gas tax increase if we thought it had any hope. But we also acknowledge that we've got to find other resources. So, we've been very supportive of the expanded pilot test for road usage charging and those kinds of programs to see if we can overcome public resistance and concerns about it.

**MR. JONES:** Before we dive into the topics for this afternoon, I want to check in with you to see what epiphanies or revelations you may have had from this morning.

**MR. PEDERSEN:** I really appreciated this morning's discussion. There were a number of points made that will be helpful for us as we go forward with our future interstate study. I was taken by the thought that we really should design what the future looks like and then work backward and figure out how we get there, rather than just letting the technology drive our decisions. Part of the design of that future is identifying the unintended consequences we want to avoid. I would also encourage this group to try to keep our focus on looking out 30 years in the future, and not get caught up in today's issues.



**MR. THANIEL:** I'm excited about the consensus here that technology – autonomous vehicles, vehicle to vehicle, vehicle to infrastructure – will drive transportation. I'm also excited to hear from this group that we have to build and modernize existing infrastructure today to make sure that this technology can work in the future. The challenge is finding the resources today to design, rebuild, and modernize our infrastructure. That has to happen.

**MR. JONES:** Thank you. Let's talk a bit more about smart cities and smart design. What do our cities and urban areas look like in the future? What kind of transportation systems are we going to need? Will we need less of some things that we are so reliant upon today and what other new things will we need in this future?





# MOVING BEYOND TODAY'S INFRASTRUCTURE

During this segment, participants talked about the trade-off between retrofitting and renewing existing infrastructure, versus scrapping and rebuilding to take maximum advantage of fundamental changes in technology. They also talked about the constraints caused by existing infrastructure and current thinking.

**MR. SMITH:** There are many ways we feel constrained by the infrastructure that we have. For example, I live in Vienna, Virginia and eventually there will be a lot of houses in my area being torn down and being rebuilt because we've moved forward so much with technology, including energy efficient homes, that it makes economic sense to do so. When do you transition from repair to replacement? I think that's going to be a challenge for us to figure out as we look for the most sustainable solutions. In some ways, developing countries have an advantage in that they can skip over some of the things that we've done. In many ways, it's going to be tougher for us because we are trying to adapt the infrastructure that we have.

**MR. JONES:** Here's a related example. When the tolling industry started to introduce all electronic tolling facilities in which no cash was collected on the roadway, we had to rethink the whole idea of what a toll road is, including toll plazas, toll collectors, etc. We had to think about the people who use the roadway in a very different way – as customers – and think about how to make their lives easier. As you said, Tom, we are constrained by the current infrastructure. But we are also constrained by our current thinking. If the only tool you have is a hammer, you tend to think of every problem as a nail when maybe what you need is a wrench or screw driver.



*"We are constrained by the current infrastructure.*

*But we are also constrained by our current thinking."*

– PAT JONES

**MR. WRIGHT:** I can imagine one of the main features of a smart city being, for lack of better terms, seamless mobility. Maybe it's a shared Uber that takes you to a bus or light rail. Take the decision as to mode out of the equation but it says, how do I most efficiently get from the place that I am to the place that I want to be.

**MS. INGRASSIA:** From a user perspective, if you can customize that to your personal situation, that makes this even more robust, flexible and personal.

*"One of the outcomes that the city of Columbus, Ohio wanted to achieve was to cut infant mortality by 75 percent in a neighborhood that has very poor access to health care."*

– NEIL PEDERSEN

**MR. PEDERSEN:** One of the things I concluded from my research on smart cities is that the first step is to define the outcomes that you are trying to achieve. The outcomes are very rarely transportation outcomes. One of the outcomes that the city of Columbus, Ohio wanted to achieve was to cut infant mortality by 75 percent in a neighborhood that has very poor access to health care. That was one of the reasons they won because they defined these types of outcomes and then figured out what to do from a data standpoint and from a provision of services standpoint to achieve those outcomes. Of course, it would be different from city to city, but you start with the outcomes that you're trying to achieve. The intent of the smart city is to use census and other data as effectively as possible to make things as efficient as possible; that's the fundamental concept. But we have billions and billions of bits of data that we need to figure out. What are you going to do with that data to achieve certain goals that you want to achieve? These goals could be directly related to transportation – things like significantly improving traffic operations as a result of having far more sensors, every vehicle on the roadway being a data source, so that you can have more efficient traffic operations. Having information on parking space availability so that anybody who's driving can know where to find the parking space rather than spending 15 or 20 minutes driving around looking. These are fundamental elements of any smart cities proposal. And it's not limited just to downtown areas. We can gather this data in rural areas as well if we have the sensors in place and the means by which to collect and process the data.

**MR. HEALY:** I'm focused on federal issues but there are many funding sources we're interested in. In transit, you have state funding, you have local funding, which has been growing of late, you've got the fares, and then you've got federal funding. So how do you make smart decisions with all those people involved – the state, the locals and the federal? It's very difficult.

# LEADERSHIP AND MAKING THE CASE FOR INFRASTRUCTURE INVESTMENT

Too often, transportation professionals focus so intensively on the state-wide, mission-wide, or global benefits of infrastructure investment that they end up losing the attention of citizens who see the same services or assets through a more personal lens. The group explored the effort to make the case for transportation funding and considered how to build a more effective, outcomes-based narrative.



**MR. WRIGHT:** For me the important part of the discussion is the issue of making the case for infrastructure investment. For generations, we've thrown a big number up on the wall and hoped that that was going to convince people that there was a need that had to be met, and I think we didn't achieve much of anything with that. If anything, we scared people away with numbers so large that no one could relate to it. At the other end of the spectrum is the argument to make it local, make it personal, make it about something that affects people on a daily basis. And we've seen local governments and state governments have some success using that strategy. But ultimately this discussion about autonomous vehicles and smart cities and such, brings in another tactic for us to use in convincing people and making the case for investment. If we can get another constituency excited about what transportation means and what mobility means and how important it is in their lives, maybe that's another way in which we continue to make the case for transportation investment. Of course, it's an end in itself, but if we can also attract a different audience to this discussion, maybe we have a more compelling message to sell.

*"This discussion about autonomous vehicles and smart cities brings in another tactic for us to use in convincing people and making the case for investment."*

— BUD WRIGHT

**DR. HENDREN:** All day long I've been waiting to confess that I'm a data hound and I think that data is our ticket to getting people to understand the value of transportation. We have learned that yes, our customers care about congestion but they really, really care about reliability. Over the last decade our industry (thanks to probe data) has made the shift from assessing our transportation system performance as "level of service A-F" to talking about travel time reliability. This is huge for our industry that we made that shift from evaluating capacity to evaluating reliability. Data will open up our ability to make other shifts as mobility shifts from "how long will it take me to drive there" to "what mode should I select to get to where I want to go?" Data can give users the ability to make better informed decisions and give us the ability to make the case for transportation investments in a manner that reflects what people want. In short, we are getting more and more data that better reflects what customers care about. And we'll need that data to make the case for infrastructure investment.

**MR. HEALY:** Does the data move politicians? I think it's very hard for the politicians to isolate their decisions. You don't make a decision on transportation without thinking about all the other things that you're dealing with.

**MR. WRIGHT:** I question whether transportation will ever be an issue that decides whether a person gets elected or not. I'm not sure that's possible, but I think that's part of the challenge we have.

**MR. GROSSMAN:** The conventional thinking has been that voting for a gas tax increase would lose you an election.

**MR. RUANE:** It hasn't affected people's re-election in the 18 or so states that have done this. Almost all have been re-elected.

**MS. HALE:** What we need to do on a national level is what a lot of governors and mayors have done around the country which is show why some of these projects, large and small, actually are going to benefit people. People think that once their money goes to Washington it just gets wasted. When the governor of Rhode Island says, we are going to work on this, and this is how much it's going to bring into the state, and





she puts her muscle behind it, they believe her. So, we must figure out a way to make necessary projects hit home.

**MR. SMITH:** I think we also need to say what it costs if we fail to act. Our failure to invest in infrastructure is costing the average family \$3,400 a year, or about \$9 a day, due to added costs from power outages, sitting in traffic, car repairs, water lost in leaky pipes, etc. The public could avoid this hidden tax by investing \$3 a day in infrastructure.

**MR. THANIEL:** There are two issues that I'm thinking about here. Since the completion of the original Interstate Highway system, the nation has struggled to define a clear national narrative for infrastructure investment. Until we're able to help Congress and the next administration speak to the need for infrastructure investment, we're not going to get anywhere. Especially as states and cities put more money into infrastructure investments, in many ways they are taking the pressure off Washington, and that's not how you build a national system either. In Los Angeles, Mayor Antonio Villaraigosa, at the height of the great recession, passed a sales tax increase for investment in transportation infrastructure, primarily 30 years of transit projects in just 10. He argued that the investment would create hundreds of thousands of well-paying jobs and create a more sustainable city and metropolitan region.



**DR. HENDREN:** When we speak to our spouses and neighbors, they often say, "I don't understand why you folks keep asking for money, it seems fine to me." We have engineers who assess a bridge and put a label on it, but then people still drive over it. The average person thinks the system looks a little worn but it's still kind of working. We're in

# \$3,400

**The cost of deteriorating infrastructure takes a toll on families' disposable household income and impacts the quality and quantity of jobs in the U.S. economy. From 2016 to 2025, each household will lose \$3,400 each year in disposable income due to infrastructure deficiencies.**

*Source: Failure to Act: Closing the Infrastructure Investment Gap for America's Economic Future. American Society of Civil Engineers, 2016.*

a Catch-22 and I think we need to better articulate what it is that we need the investment for. I don't think people are convinced that we have a broken system.

**MR. WRIGHT:** One thing we barely touched on is the jurisdictional responsibility. Whose job is it anyway to take responsibility for the things that we've been talking about? Even if you make the case for transportation investment at a substantial level above where we are today, is it a federal role, is it a federal responsibility? We have a very complicated system in the U.S. with local governments, states and increasingly the private sector providing transportation services. You walk into a congressional office and people say, "Absolutely, we believe in transportation investment. But we don't agree that the federal government should be involved in this or that or the other thing." So, we've got to take that into account. Do we have a consensus around the importance of transportation? I don't believe we do. But even if we got there, that isn't going to solve the problem.

**MR. SANDHERR:** I think we've all avoided the obvious: What's really required is presidential leadership. Every time we've gotten an increase in the gas tax, it's because of presidential leadership, even when it didn't go into the highway trust fund. You have Trump out there talking about infrastructure. He has the concept. I think there is a way to thread the needle. But presidential leadership is a crucial part of it.



*"I think we've all avoided the obvious: What's really required is presidential leadership. Every time we've gotten an increase in the gas tax, it's because of presidential leadership."*

– STEVE SANDHERR



**DR. HENDREN:** Right now, we are blind to the cost of transportation. Nobody out there knows it's 18.4 cents a gallon for the gas tax. What I'm hoping is that as technology changes and our relationship to transportation changes, we are going to get the public on board. The freight industry gets it, they understand they need to contribute revenue to support the infrastructure that we need to have a vibrant economy, a healthy economy. The public is not on board yet.



*"Right now, we are blind to the cost of transportation. I'm hoping that as technology changes and our relationship to transportation changes, we are going to get the public on board."*

– PATRICIA HENDREN

**MR. RUANE:** This is my take on this. Washington is a fact free zone and it has been for a long, long time. Every argument we use today is empirically based, so we are not anti-data. We want the facts to justify any recommendation we make. This is a political challenge. My concern is that we keep our focus and that whatever vision you come up with – whether it's 20, 30 or 40 years from now, it recognizes the true role of government in transportation. To get political support for enhanced and increased and more effective programs you can't have a Christmas tree approach. You have to narrow it down to the things that people can relate to. People have to see the merit and tangible benefits soon, not off way in the distance and that's why we have chosen to focus on the freight issue. We've been pushing the critical commerce corridors approach for eleven years. It got a little traction in the FAST Act. There is support to do this, but there's no money. It means nothing without resources; it's just a concept. We are continuing to push the idea of using what our freight network needs to be viable and productive in our modern economy as one of the key linchpins to get the politicians to do something. I agree one hundred percent that we need presidential leadership. If we don't have it, forget about it. A lot of people are advancing private investment and PPPs. I'm not denigrating that; it's





part of the deal, it should be there. But let's be candid; it represents no more than ten percent according to the research we've done. All these states do not have projects that could be privatized. So, you've got to come up with a program that makes sense to all 50 states, all the governors, all the politicians. You need some central focus on it. Are we aware of what just happened in the election? I don't think we are going to see enhanced, broadened, deeper federal involvement on everything under the sun. It's not going to happen.



*"We are continuing to push the idea of using what our freight network needs to be viable and productive in our modern economy as one of the key linchpins to get the politicians to do something."*

– PETE RUANE

**MR. JONES:** We talked about leadership earlier and we've tended to speak as if leadership was monolithic, but in many ways, it's dispersed. To get what you're looking for, Pete, you need presidential leadership and congressional leadership. But you've also put out a report saying that ballot initiatives that were approved in the various states this year resulted in 200 billion dollars in recurring or new investment in infrastructure at the state and local level. So, there is a lot of leadership taking place at the state and the local levels where people are identifying specific needs to their local constituents.

**MR. RUANE:** A point of clarity, the federal money is actually 52 percent on average of capital investments in the states, and in little Rhode Island it's 89 percent. People don't realize that. When you see the data, they say, my God, you mean 50 percent of our capital investment is coming from the Feds? This is important, but it's not always transparent to folks. I really think that we've got to narrow the focus and not get caught up in trying to solve every problem under the sun.

**DR. HENDREN:** I still believe data is king. I agree with all the comments about politicians and making sure our arguments are dropping into their personal focus areas. But data sure makes it a lot more awkward to not make a good decision.

**MS. JACKSON:** I think as far as making the case for infrastructure investment, data is necessary to make the case for why it's important specifically for taxpayer dollars not to be wasted. You have to get to the root of why something is bad politics for a congressman. That is because their constituents don't agree with it. So, you need data to make the case of why infrastructure investment is important.

**MR. GRELLA:** Congress is not getting re-elected and they are not getting bonuses for solving problems proactively. They want to know if voting for a particular bill is politically perilous for them or not.

**MR. GROSSMAN:** I tend to agree with Jonathan's read on reality. So, does the road to this future state of transportation have to go through Congress? Is there another way to get there? Do we have to instead focus more on the governors and localities? Is there a way to organize and unify them? Is there a role for the National Governors Association? Does it have to go through Congress?

**MS. ROHDE:** Let's not fall into the trap of thinking that these funding issues and the way elected officials behave is entirely predictable. In my organization, we've had good experience on an issue that was initially fairly controversial. When we started the MBUFA effort, I decided that I didn't want to follow a transportation model to get federal funding. I didn't think it would be successful for something that was unique. I decided to use a model we used when I was in the governor's office because we were the first state, in Minnesota, to do school choice. It was a good example for me of how to move this issue forward: just keep talking to people. I cannot lump everyone into the same predictable political spectrum. Key Republican leaders fought to get the \$95 million for us and I never would have expected that they would have pushed for user fees. We started by talking to Democrats who were very supportive. Then we started slowly working on Republicans and, in the end, they were the ones fighting for this. So, I think we have to be very careful not to fall into the trap of saying "this person's going to do this and this person's going to do that." Because if somebody had told me four years ago that key Republican leaders would be our best friend on this issue, I would have disagreed with you.

# CONCLUDING THOUGHTS

**MR. JONES:** I have a few summary thoughts about the discussions today. Ian, thanks for observing the consensus around the inevitability of the movement to autonomous vehicles. Marcia, thanks for the idea of following up this meeting by bringing in a futurist to give people a common understanding of what may be ahead of us. We need to look beyond our own transportation universe and see what's happening in the rest of the infrastructure world to be able to adapt. Neil, you talked about achieving outcomes and noticing that many of those are not necessarily transportation related. Steve had a great observation about how the transportation system adapts to the choices that people are making. Bud made a thoughtful observation about the case for transportation investment and making it about things that affect people in their daily basis. Many people made similar observations in the interviews. Ron, you asserted vigorously that we have not defined a clear narrative on infrastructure investment since ISTEA.

**MR. WRIGHT:** It's always useful for me to hear where everybody else in this community is on the issues of the day and to determine where we have common ground. We have a lot of common ground on the issues that we discussed today. We are always willing to participate in this kind of dialogue because it does help us to understand where people are and what can we take to the Congress that we can say is a common view and a common interest.

**MR. HEALY:** I think it's very helpful to understand and to listen to one another. Moving forward, to the degree we could have some common goals, some principles that we could agree upon, that might be worth thinking about. I think it's hard for all of us to look long term. We're all trying to get a perspective on the long term, but really what we are trying to do is inform our short-term efforts. It's hard for all of us to focus on what's going to happen in 2040. Some of the issues we didn't get to, but I appreciate your doing this. I think it was very helpful, it makes me think. The other thing I'm struck by is that it is complicated. People's transportation needs are not monolithic. One challenge we will all face is people thinking, "It ain't that bad" and "What are you guys complaining about?" Those are some of the challenges we face.

**MS. HALE:** I would suggest that within a month or so we are going to be in the position of reacting to some kind of proposal, so we had better know what we want. What's bothered me most over the last couple of weeks is that everybody, without even knowing what the administration is going to propose, they've gotten into their partisan corners already. We need to try to stop that until at least there's a real proposal out



there that we as individual organizations and then as a group can take a look at.

**MR. PEDERSEN:** Great session, great discussion. Thanks for pulling us together. The biggest challenge with a session like this is synthesizing it and figuring out what the larger meaning is. Someone needs to take a cut at what a common vision would look like, even if it's just an outline. That could form the basis for an ongoing discussion.

**MR. GROSSMAN:** I would not discount the value of just getting around the table talking to each other. I wouldn't force us to have an action plan. I would embrace the value of just exchanging views on policies, ideas, visions of the future and be very comfortable that there is value in the conversation without having to create a to do list at the end of the conversation.

**MR. THANIEL:** Pete said something that really caught my attention and that is the need to design infrastructure today so that we can accommodate autonomous vehicles and other types of technology down the road. I think it will be helpful to have a deeper conversation on the types of infrastructure design and investments that we need today. That will help us influence the administration and the Congress in their thinking about the investments that need to be made.

**MS. INGRASSIA:** I agree with Ian that we shouldn't put so much pressure on the group to have a defined action plan to come out of this. But I do think it will take some nurturing to keep everybody together and continue to dialogue, which is a challenge itself.



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